USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

TITLE: INTERACTIONS BETWEEN ESTUARINE MICROBIAL BIOFILMS AND TRACE LEVELS OF CADMIUM, AND THEIR COMBINED EFFECTS ON OYSTER LARVAL SET AND METAMORPHOSIS.

DURATION: 09/01/96-(38/31/97

FY '96 FEDERAL FUNDS: $22,000

FY '96 NON-FEDERAL FUNDS: 44,600

PRINCIPAL INVESTIGATOR AND INSTITUTION:

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CONGRESSIONAL DISTRICT WHERE WORK WILL BE PERFORMED: MD-03

STATEMENT OF CRITICAL REGIONAL OR STATE WATER PROBLEM:

It is well documented that many marine microbial biofilms are comprised primarily of anionic exopolysaccharide (EPS), that such films cover nearly all marine surfaces, are a significant part of neritic sediments, and that such biofilms sequester numerous cations with varying affinities. It also accepted that microbial biofilms are beneficial to benthic fertility, flora and fauna, including invertebrate set - i.e. microfouling precedes macrofouling. Metals of concern such as cadmium are bioconcentrated on surfaces that are also important for benthic larvae to initiate metamorphosis, a process that has been shown by several laboratories to be extremely sensitive to the presence of heavy metals. This study will help determine the fates and effects of dissolved Cd in the presence of microbial biofilms and *Crassostrea* larvae as an indicator organism, so that water resources can be more knowledgeably managed.

STATEMENT OF RESULTS, BENEFITS OF INFORMATION:

We have determined that dissolved Cd is bound and concentrated by reference pure culture prokaryotes and by autochthonous estuarine biofilms in Chesapeake Bay, and we are investigating whether existing or potential levels of these metals in Chesapeake Bay may disrupt oyster (bioassay species) development in benthic biofilrns. Results of this study will be included in progress/final reports, workshops, at least one international conference (e.g. Microbial Ecology) and in peer review literature *(e.g. J. Shellfish Res.; Appl. Environ. Microbiol.).* Together with other studies from the Maryland Water

Resources Research Center, the data would become a basis for management and regulatory decisions.